# ABSTRACT

CHARLES UNIVERSITY
Faculty of Pharmacy in Hradec Králové
Department of Pharmaceutical Technology

Name of author: Dominik Vavřich
Title of diploma thesis: Rheological behaviour of mixtures for freeze-drying
Supervisor: PharmDr. Eva Šnejdrová, Ph.D.

The diploma thesis deals with the evaluation of rheological properties of aqueous dispersions of fish gelatin and carrageenans intended for lyophilization. Theoretical part of this work is dedicated to the characterization of fish gelatin and carrageenans which were used for preparation of the mixtures in experimental part of this work. Characterization of an oral cavity from an application of medicaments point of view and an orally disintegrating tablets of the medicine with a focus on the lyophilized tablets are also presented. Mixtures of the fish gelatin and the carrageenans were prepared in the experimental part of the work. Their rheological behaviour employing an absolute rotational rheometer Kinexus Pro$^{+}$ was measured and evaluated. Also, the testing of the rheological characteristics of these materials transformed into the freeze-dried tablets was performed. Nonlinear viscous curves were obtained, and they were mathematically evaluated by the Power law model. Pseudoplastic behaviour of the mixtures can be derived from the results of acquired viscosity curves. Rheological characteristics were defined by viscosity values from a velocity gradient 10 $s^{-1}$, a consistency coefficient *K*, and a flow index *n*. Measured values of the $\eta_{10}$ dispersion of the fish gelatin shows that the viscosity is increasing with increasing concentration of the fish gelatin. The highest values of $\eta_{10}$ revealed the dispersions of commixture λ/κ carrageenan. The best formulation for lyophilized tablets for oral use is a dispersion of 5 % mannitol and 0.3 % λ/κ carrageenan due to the highest consistency leading to the assumption of higher adhesion and prolonged release of active substances after application to the oral cavity.

**Key words:** fish gelatin, carrageenan, oral cavity, ODTs, lyophilized tablets, viscosity, consistency coefficient, flow index